

R&D funding for that discipline is exactly proportional to total R&D funding in the state. On the other hand, a location quotient equal to 2.0 would mean that the discipline has double the proportional amount of R&D funding.

16. In 1994, location quotients for biological, medical, and other life sciences all exceeded 1.0, along with materials engineering. Those four fields may be regarded as potential specializations in the state. There is a significant break in the location quotients between agricultural sciences (at 1.0) and all other disciplines (the next highest is oceanography at .8). Observing those measures over time also suggests the erosion of state specializations in agricultural sciences, other physical sciences, and, interestingly, computer sciences between 1985 and 1994, at least in terms of R&D funding. The location quotients for these sectors all dropped significantly over the period.

The NSF disciplines and their 1994 R&D funding location quotients are aerospace engineering (.01), agricultural sciences (1.0), astronomy (0), atmospheric sciences (.01), biological sciences (1.2), chemical engineering (.6), chemistry (.7), civil engineering (.7), computer science (.6), earth sciences (.6), electrical engineering (.6), materials engineering (1.6), mathematics and statistics (.8), mechanical engineering (.6), medical services (1.4), oceanography (.8), other engineering (.7), other geosciences (.5), other life sciences (1.3), other physical sciences (.2), and physics (.6).

17. *Allocating Federal Funds for Science and Technology*, Committee on Criteria for Federal Support of Research and Development, National Academy Press, Washington, DC, 1995.
18. Data are from the National Science Foundation's Survey of Federal Funds, which primarily reports data for the following agencies: Agriculture, Commerce, Defense, Energy, Health and Human Services, Interior, Transportation, EPA, NASA, and the National Science Foundation. These agencies account for over 97 percent of federal R&D spending in North Carolina.
19. While North Carolina's slice of the federal research and development budget has held relatively steady, the distribution of the budget among other states has shifted significantly, with some states' share of federal R&D declining and others' increasing. Over the last two decades, Georgia, Missouri, Florida, Colorado, and Texas have experienced increases in their share of the federal R&D budget, while shares held by New Mexico, New York, Massachusetts, and California have all declined. Georgia's dramatic increase is due specifically to that state's development of the Air Force's F-22 fighter aircraft. Once R&D on the F-22 is complete, Georgia's share is expected to decline. See *The Future of Science and Technology in the South Atlantic: Trends and Indicators*, Center for Science, Technology, and Congress, American Association for the Advancement of Science, Washington, DC, September 1997.
20. See *Technical Appendix Table 36*.
21. Shift-share analysis, a technique usually applied to the study of industry growth, provides one means of quantifying these different influences (see *Technical Appendix Table 37*). The technique simply involves the evaluation of plausible counterfactuals. The national R&D budget grew by 3.6 percent in current dollar terms; other things equal, we would expect North Carolina's federal R&D budget to grow at the same rate. Call that